

Title:

The Acute Effects of Heightened Physiological Arousal and Focus of Attention on State Interoceptive Accuracy

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Abstract:

Introduction: Since interoception, defined as the sensing of signals originating within the body (Craig, 2003), is integral to self-regulation and health, research has focused on methods to improve interoceptive accuracy (IA). Previous studies have shown that both physiological (e.g. induced physiological arousal) and cognitive (e.g. focus of attention) manipulations can be used to alter state IA. Here, attention regulation appears to be key, where physiological arousal is proposed to narrow attentional resources to favour task-relevant stimuli (Schulz & Vögele, 2015), whilst directed attention towards a specific sensory channel is thought to increase its precision in perception (Petzschner et al., 2018). Considering the success of both manipulations in isolation, this study tested for potential interaction effects. Thus, the hypothesis was that individuals' IA would be most affected by an activity in which the focus of attention is directed towards internal bodily signals (i.e. adopting an internal focus of attention) whilst the signals are more easily accessible to our conscious awareness (i.e. while being physiologically aroused).

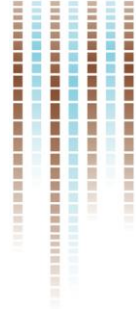
Methods: 24 healthy adults (12 females, 12 males) participated in this study. A 2x2 crossover design was used to study the effects of physiological arousal (active vs sedentary) and focus of attention (internal vs external) on state IA. All participants completed all conditions (4x20 mins), with IA measured by means of a heartbeat tracking task immediately after each manipulation. In the active conditions (cycling), the incremental intensity ensured participants surpassed the lactate threshold in the final stages, whereas in the sedentary conditions, participants remained seated. In the internal focus conditions, participants were guided to focus their attention towards internal bodily signals (heart, lungs and muscles), whereas in the external focus conditions, participants listened to an audiobook.

Results: At baseline, an independent *t*-test showed that IA was significantly higher in males ($M = 0.82$, $SD = 0.16$) than females ($M = 0.48$, $SD = 0.37$), $t(22) = 2$, $p = .001$, $d = 1.18$. An ANOVA (2x2 repeated measures) testing the main hypothesis revealed no significant effect of physiological arousal or focus of attention, and no interaction effect. However, when controlling for sex and attention regulation (AR) scores, there was a significant effect for physiological arousal, $F(2,23) = 16.83$, $p = .001$, $\eta_p^2 = .45$. Splitting the groups by sex revealed that the significant effect for physiological arousal was driven by the females, $F(2,23) = 23.75$, $p = .001$, $\eta_p^2 = .70$, since it didn't reach significance in males ($p > .05$).

Discussion/Conclusion: These findings provide useful information for the development of future interventions, supporting the importance of physical activity to interoceptive processes. Furthermore, results highlight the importance of taking individual differences into consideration; the subjective ability to switch focus between internal and external cues (AR) could be fundamental in determining effects. Future studies should increase the sample size to allow for comparison between sexes, and also between athletes and sedentary individuals.

References:

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